

## "Simpatic" Surfaces

by Carlo H. Séquin

Topology is the science of geometric connectivity. Topologically, the "genus" of a surface is constant and does not change as long as we change the shape smoothly without creating any cracks and without filling in any holes by "gluing" different surface pieces together. Even more interestingly, surfaces that have widely different shapes but the same genus can be transformed into one another (Mathematicians allow different parts of a surface to intersect one another without counting this as a connection).

The "genus" describes how many holes a solid object has: a sphere has genus zero, doughnuts and coffee cups have genus one, a button with two holes has genus two, and so on. Sometimes one might be misled in seeing a hole where there is none: a hollow sphere with a single hole from the outside to the inside, i.e. the shape of a fish bowl is still genus zero since there is not any hole all the way through; only by drilling an additional hole into the wall do we create an object of genus one. Similarly, a hollow shell with 17 holes into the cavity would only be of genus 16. (See diagrams on page 2).

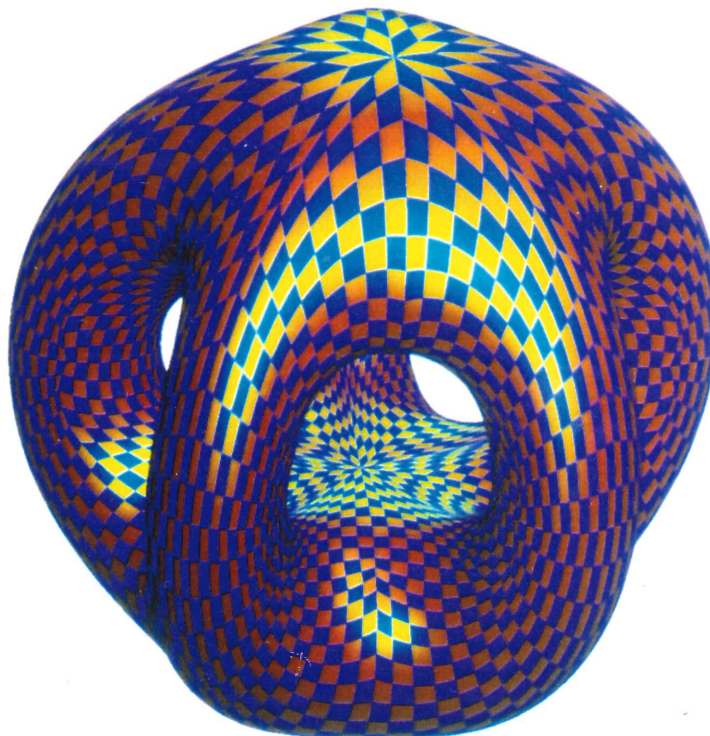
I have long been interested in geometry and geometrical structures. Recently I have become interested in "minimal" surfaces of various kinds because of their simple and elegant shapes and the sense of geometric beauty that they portray. Mother Nature likes to do things efficiently and with the least amount of "cost." For instance soap bubbles are spherical because this is the most efficient package with the smallest surface area to contain a certain volume of air. Also, soap films spanning the space in warped wire loops form minimum-area surfaces: any

small distortion of the naturally assumed shape would be associated with an increase in total surface area.

Similarly, when bending elastic materials, Mother Nature prefers solutions that minimize the total bending energy stored in the deformed material. When a steel rod or a thin wooden slat is pinned down in a few places, it does not form kinks or sharp corners, but rather assumes the shape of a smooth "spline" curve which tries to minimize the amount of bending at any one point. The shape assumed by an ideal elastic rod is the curve with the minimal total bending cost which passes through the constraints represented by any confining pins. Mathematically, bending energy is related to the square of curvature at every point; to find the total bending energy we have to integrate this expression over the whole length of the rod. The same principle applies also to stiff two-dimensional elastic membranes; they minimize the integral of the bending energy taken over the whole surface. This results in smooth shapes known as "Minimum Energy Surfaces." Such minimum energy curves (MEC) and minimum energy surfaces (MES) have long been studied and are used to produce smooth

shapes for ship hulls or car bodies.

Henry Moreton and I have recently investigated a new "cost" functional. We are trying to minimize the variation of curvature, rather than curvature itself. Thus we are computing integrals over the square of the change in curvature and are trying to find shapes that minimize this new "cost function." The resulting curves and surfaces look even smoother and more pleasing than the minimum-energy shapes, and they have a few other advantages. The perfect shapes for curves and



**Simpatic Surface, a mathematical shape computed by Carlo Séquin**

## "Simpatic" Surfaces, *continued from page 1*

surfaces are circle and sphere, respectively. Both of these have the same curvature everywhere and thus a curvature variation of zero; their total integrated "cost" is thus also zero. It turns out that cones, cylinders, and tori (doughnut shapes) also have zero "cost"—and that is rather desirable since these shapes are technically important. Thus the new "Minimum Variation" functional naturally brings together artistically pleasing free-form surfaces with geometries that are important in manufacturing.

Henry has created a computer program to generate such Minimum Variation shapes. A sophisticated optimization loop plays with all degrees of freedom of a given surface to find the shape that minimizes the cost of curvature variation, while keeping the surface within any specific constraints such as supporting pins or clamps, or specification of a certain curvature at a particular point. The major drawback to this new type of optimized shapes is that it is computationally very costly to find the perfect solutions for these shapes. Even for simple shapes, the computer program may run for many hours or even days. However, the resulting shapes are well worth the wait—and we are working on developing faster methods to calculate these functions. The color picture accompanying this article is an early result applying this new optimization method to an unconstrained surface of low genus.

Topologically, we can distort any given object and try to make it ever more smooth and simple, until we have the simplest, smoothest form for this object and for any other one with the same genus. The question thus arises: What is this simplest shape for a particular genus value?

The program described above allows us to answer this question. We simply optimize a surface of a particular genus—with no external supports or any other constraints—until the curvature variation cost functional has reached the absolute minimum. Henry and I have applied the new cost functional to surfaces of low genus. To keep the computational effort reasonable, we used a somewhat simplified cost functional that calculates the square of the curvature derivatives just along the principal directions of minimal and maximal curvature. However, we found to our dismay that during optimization the shapes would just expand forever; this is because expansion reduces the overall curvature and thus also the variation in curvature!

Of course, we could limit this growth by clamping the surfaces down with a few confining points on the outside. But if we want to know what the ideal, totally unconstrained shapes look like—analogueous to floating soap bubbles—then we have to further modify our cost functional so that it becomes scale-invariant. By introducing a multiplicative cost factor for the total area of the surface, we can balance the expansion force; now if the surface tries to grow to reduce curvature and curvature variation, the area gets larger by the corresponding amount, and the cost no longer diminishes. This then leads to the notion of a "SIMPATIC" surface, where the adjective—in addition to the obvious implied connotation—also is an acronym for "Scale-Invariant, Minimum Product of Area Times Integrated Cost."

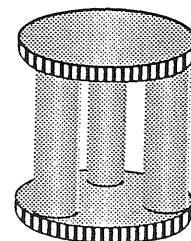
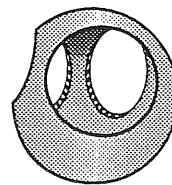
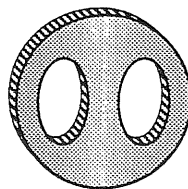
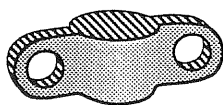
The shape displayed has been calculated on a Silicon Graphics workstation as a true three-dimensional shape. With the rendering power of

these workstations, such shapes can be manipulated interactively. This conveys an excellent feel for their true shapes. Here we can present only a static rendering. To provide a better feel for the shape, we have mapped some geometrical textures onto it. In other cases, we have made the surfaces somewhat reflective, and rendered them with the highlights produced by a couple of point light sources. I hope that my picture still conveys a notion of the elegant beauty of these Minimum Variation surfaces.

### **Thank You, Laser Today!**

Laser Today in Mountain View, CA, has generously provided *Ylem Newsletter* with the color copies on the cover, using its Canon CLC 500 color copier. This Canon copier is equipped with a computer, the Canon Intelligence Processing Unit (IPU). Laser Today is developing its own software, a new product to link PC or Macintosh computers to the Canon copier. Called LaserLink, it is especially designed to give faster, more accurate results with Photoshop files, scanned images and other bitmaps. The competing software is designed primarily for Postscript files, and unlike Laserlink, can't utilize the weird and amusing functions in the Canon IPU to distort the image.

Artists can take color graphics files on disk to Canon service bureaus to get color printouts, or their works of art can be scanned in. Two service bureaus in San Francisco currently offering the Laserlink interface are: Copy Service Corporation, 385 Bush St., telephone 415-781-4309; and Krishna Copy, 214 California St., 415-391-4111



Genus-2 Objects: The Indian pot with two handles on the left, the wing nut, the two-hole button, the hollow shell with three holes, and the simple gazebo with three columns on the right are all of the same topological connectivity and can be mathematically transformed into one another without discontinuities.



## FISEA 93

November 3–7, Minneapolis College of Art & Design

2501 Stevens Ave. South, Minneapolis, MN, 55404-4343

Contact: 612-874-3754; Fax 612-874-3732; fisea93@mcad.edu

Computer art by Roman Verostko, director of FISEA 93.  
Verostko's computer produces images algorithmically,  
and signals to him when it needs  
an inked Chinese brush.

Fourth International Symposium on Electronic Art. Theme: *The Art Factor*. Each "modern" art movement has been engaged in a dialectic with its predecessor, producing works that were "art about art." But the electronic arts community has come to the endeavor of art somewhat sideways, intensely involved with the interaction between humans and machines. The whole range—from networks to artificial life—has seduced many to total commitment. What draws them? How are we to assess their work? FISEA 93 aims to stimulate greater dialogue on the "art factor" in the work of artists who have been involved with this Human/machine dialectic. The intention is to promote a greater understanding of both the formal aspects of the work and its technology. The keynote address by Jan Hoet of the Documenta IX exhibition is "Art and Tech—Paradox or Challenge"; Brenda Laurel talks on "The Soul and the Machine: Artists and Technologists in Collaboration"; and many other fascinating presentations! Applications include artificial life, virtual reality, automata, networking, body and sound arts. The following Ylem members will be presenting workshops, concerts or papers: Ken Rinaldo, Stephen Wilson, George Shortess, Sylvia Pengilly, Craig Harris, Trudy Myrrh Reagan, Stewart Dickson, Helaman Ferguson and Mary Stieglitz Witte. Sonya Rapoport and possibly others will be showing work in the exhibit.

## Ylem Forum: Computers, Artists and the Cosmos

Wednesday, November 3, 7:30 pm

McBean Theatre, The Exploratorium, 3601 Lyon St., San Francisco

Contact: Beth Avary, 415-851-3125

Two artists whose work is cosmic and visionary demonstrate and explain their work using computer graphics and animation.

**Joel Hagen:** "An Artist Explores Mars with an Amiga." Hagen combines art with his interests in paleontology, astronomy and space science. His Amiga animation received grand prize in the first BADGE animation competition, and in 1989 he won first prize for his Amiga animation program, *The Director*. He writes a regular column on the use of personal computers in the arts in *Amigaworld*. He is a founding member of the International Association for the Astronomical Arts, and co-founder of CONTACT, an annual interdisciplinary creative symposium regarding human futures in space.

**Garret Moore:** "Creativity and the Digital Frontier." Moore is an illustrator who has done works for books by Isaac Asimov and for the future space program at NASA. He infuses his work with visionary qualities, saying, "If we were truly made in God's image (Creators), we should also create with the same responsible love and sacredness of the Great Spirit." He has done computer illustration as well as paintings for several years now, and is now moving to 3D animation, video and interactive technologies. He recently co-produced a computer-animated video for 15,000 people attending a benefit performance for Missing and Abused Children featuring the Las Vegas Symphony and vocalist Jon Anderson.



# YLEM GALLERY

## Events

October 1,2,3

### Dances for the Mind's Eye (Aptos, CA)

Dances about Science and mathematics choreographed and performed by Dr. Karl Schaffer, Erik Stern and Professor Scott Kim. These are funny! Kids love them! \$8 adults, \$5 children. **Performances on Fri., 8 pm; Sat., 2 & 8 pm; Sun., 7 pm. Cabrillo College Theater, Aptos, CA; info: 408-439-8541**

October 3-7

### Video Expo/Imageworld, New York

Jacob K. Jarvis production, computer graphics, animation, interactive multimedia, etc. **Knowledge Industry Publications, Inc., 701 Westchester Ave., White Plains, NY 10604, 914-328-9157, 800-800-5474**

Through October 10

### Manifestation for the Unstable Media V (The Netherlands)

Theme: The body as "the physical body in relation to the immaterial body in electronic space." Is man still the measurement of all things? An exhibition, radio show, symposium and some performances about our technological society in relation to the arts by an international group of artists. **V2 Organization, PO Box 11007, 5200 ES's-Hertogenbosch, The Netherlands; tel. 31-73-137958**

October 3, 2-5 pm

### "Digital Art, Where is it Going, Can it be Collected?"

The panel includes such people as James McAllister (former art director at Macromind), John Derry (formerly at Time Arts, currently one of the authors of Fractal Painter), Peter Hogg and John Crutcher from Digital Pond, Yuzo Nakano from Kalá Institute. Interactive art will be a major theme, Moderator Will Tait predicts. Come early! Room holds 250 and will likely fill up. **Berkeley Conference Center, 2105 Bancroft, Berkeley, CA; info: 510-848-3957**

October 14-16

### Computers and Nontechnology Conference

Silicon Valley prepares itself for the molecular manufacturing era. The Third Foresight Conference to be held at Hyatt Rickey's Hotel, Palo Alto. The meeting covers the ways that computers are advancing nanotechnology today, and how nanotechnology will radically change the computer industry of tomorrow. **Judy Hill, Foresight Institute, Box 61058, Palo Alto, CA 94306; 415-324-2490, Fax: 415-324-2497**

October 16-17

### Envisioning the Future (Seattle)

A national forum held at University of Washington South Campus Center focuses on the connection between computers and democracy: the National Information Infrastructure (NII) and community access. Keynote address by Bruce McConnell, Chief of Information Policy at the Office of Information and Regulatory Affairs in the Office of Management and Budget (OMB). Banquet features Kit Galloway of the Electronic Cafe in Los Angeles: Using videotapes and a live demonstration with CPSR chapters in Los Angeles and other locations, Galloway will discuss how the Electronic Cafe concept has been used in global events with poets, children, and communities. Fee, \$75; low income: \$25; banquet ticket: \$40. **CPSR, PO Box 717, Palo Alto, CA 94301; 415-322-3778, cpsr@cpsr.org or Aki Namioka, 206-865-3249, aki@cpsr.org**

October 21, 7 pm

### History of Computer Art (Portland, OR)

Lecture by Portland State University Professor Emily Young. Free. **Abaci Gallery, 312 NW Tenth, Portland, OR 97209; 503-228-8642**

October 27-29

### CD-ROM Exposition/Conference (Boston)

Electronic publishing; text, image and database management; end-user and entertainment applications; multimedia. **CD-ROM Exposition and Conference, Mitch Hall Associates, 260 Milton Street, Dedham, MA 02026**

November 3, 7:30 pm

### Ylem Forum: Computers, Artists & Cosmos

Details on page 3.

November 3-7

### FISEA 93 (Minneapolis)

Details on page 3.

## Exhibits

Through October 30

### Enchanted Rooms

German sound artist Kurt Dahlke will premiere a new installation consisting of a series of sound environments. Using only sound and light as his media, the artist creates three-dimensional worlds of perception. "This is virtual reality, not in the sense of isolation by technical manipulation, but by the integration of the individual into existing realities." Performances begin on the hour and last approximately one hour. Free. **Capp Street Project, 270 14th Street at Mission, San Francisco; 415-626-7747**

All events and exhibits occur in the San Francisco Bay Area except where noted. Is your event or exhibit listed here? Send to Ylem Editor, 967 Moreno, Palo Alto, CA 94303; [trudymyrrh@aol.com](mailto:trudymyrrh@aol.com)

Through January 4

### Larry Payne and Sister Judith (Portland, OR)

A selection of computer artwork by Larry Payne from the fine art collection of Gary and Daria Barclay. New York City's Sister Judith Savard will also be exhibiting her computer fine art. By appointment only. **University of Oregon Continuation Center, 720 SW 2nd Ave, Portland, OR; 503-725-3055**

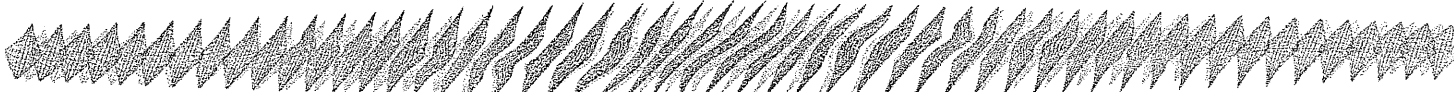


Cinderella Liberty, computer-enhanced multimedia drawing by Nancy Worthington. Cover illustration for the book, *Exploding the Myth of Self-Defense* by Judith Fein (see page 6).

Through January 1, 1994

### Virtual Holograms and Everyday Lasers

The Tech Museum, a showplace of high-tech, celebrates its third birthday. Also, ask about weekend workshops, multimedia, speakers, school labs and more. \$6 adults, \$4 youth, under 6 free. **The Tech Museum of Innovation, 45 W. San Carlos St., San Jose, CA**



Through October 2

### Digital Works by Les Barta (Reno, NV)

Computer photoconstructions by an Ylem artist. **Exit Gallery, Church Fine Arts Building, 2nd floor, University of Nevada, Reno, CA 89577; 702-784-4994**

October 6-23, 7 pm

### An Act of Resistance: Making Community(ies) (Boston)

An Act of Resistance: Making Community(ies), a multimedia event which addresses resistance to social injustices through activism and art will be presented as part of the celebration of Resist's 25th Anniversary. An opportunity to look at similar issues from varying perspectives: personal, historical, critical, and political. Among artists invited to participate is Ylem member Reed Altemus. **Opening reception: October 6, 5-8 pm. Gallery talk: October 6, 7 pm. Mobius, Boston, MA; 617-542-7416**

October 7 - November 1

### German Computer Art Collaborations; and Works by Emily Young (Portland, OR)

**Abaci Gallery:** Collaborative computer artworks created in Germany in March 1993 by visiting artist Daria Barclay with German Artists Stefanie Mattern, Udo Westkoff, and **ALEXANDER. Computer Art Museum:** Works by Portland State University Professor Emily Young from permanent collection. **Reception, Oct. 7, 11 am-9 pm. Abaci Gallery, 312 NW Tenth, Portland, OR 97209; 503-228-8642**

Opens October 7

### Understanding Ourselves, Understanding Each Other

Explore your own psychological processes through over 30 exciting hands-on exhibits and activities. And for the very young: *Playspace*, puzzles, blocks, water and sand toys, musical instruments and other activities to help parents observe child development in action. Exhibit will probably run three months. **The Exploratorium, 3601 Lyon St., San Francisco; 415-563-7337**

October 8 - December 3

### It's a Gas! (Los Angeles)

An exhibition of neon art that includes "Gyussler Rocket," a pyrex glass rocket form with electronically choreographed neon plasma, by Ylem member Guy Marsden. **Reception: Oct. 8, 7 pm. Arthur Coons Gallery, Occidental College, 1600 Campus Rd., Los Angeles, CA 90041; 213-259-2749**

October 9 - November 7

### Jewelry by Carrie Adell (Carmel, CA)

Ylem member Carrie Adell makes metal jewelry

based on images in science. Her latest pieces are strands of DNA. Earlier pieces look like eroded, fossiliferous pebbles in metal. Adell uses master metalworking techniques to achieve her effects, and has won many awards. **Reception: Oct. 9, 1-4 pm. Concepts, Sixth and Mission Sts., Carmel, CA 93921; 408-624-0661**

October 9-10, 11-5 pm

### Open Studios, San Francisco

Week one of Open Studios features three Ylem members, **Vince Kololski at 1044 Revere St., and Rainey Straus and Jaime Terans, both at 966 Minnesota St., San Francisco**

Through October 16

### Eclectic Electric (North Miami, FL)

An exhibition of neon art that includes "Luminosa Medusa," a faux stone monolith with electronically choreographed neon plasma, by Ylem member Guy Marsden. **Center of Contemporary Art, 12340 NE 8th Ave., North Miami, FL 33161**

October 16-17, 11-5 pm

### Open Studios, San Francisco

Week two of Open Studios features Ylem member Eleanor Kent. She knits fractals! She and Craig Cassin have also collaborated on fractal knitting patterns to sell. **544 Hill St., San Francisco, CA 94114; 415-647-8503**

Through October 23

### Cameras and Clay

Show includes deep sea computer images by Ylem member Michael McGuire. Here, he combines his skill at photographing the marvels he sees while scuba diving with the latest in computer color ink-jet prints. His vocation is designing computer color printers at Hewlett-Packard. **Reception, Oct. 3, 5-7 pm. Gallery House, 538 Ramona St., Palo Alto, CA 94301; 415-326-1668**

Through October 28

### Computer Laser Prints (Laurel, MD)

Ylem artist Nancy Jackson Freeman shows her computer art that blends psychology, human history and computers. **Montpelier Cultural Arts Center, 12826 Laurel-Bowie Rd., Laurel, MD 20708; 410-792-0664**

Through November 7

### Digital Art by Will Tait

**Reception Thursday September 9 / from 5:00 to 8:00 pm.** Ylem member Will Tait is also organizing a panel discussion on digital art (see Events). **Dow & Frosini Gallery, 2284 Fulton Street, Berkeley, CA; 510-841-4402; Will Tait, [turtle@usenix.org](mailto:turtle@usenix.org)**

November

### Mathematical Sculpture Unveiled

Helaman Ferguson has just installed a new sculpture based on mathematics. In this work, 24 septagons are arranged in hyperbolic space, among other things! Three different kinds of stone were used, carved to incredible accuracy by a computer-driven high-pressure water jet. **Patio of Mathematical Science Research Institute, 1000 Centennial Way, Berkeley, (Uphill from the Lawrence Hall of Science)**

## Opportunities

Deadline October 5

### Fall Salon: Introducing the Radicals.

Awards. Work completed in the last 2 years that is "radical in design, ideology or both. Show Nov. 5-Dec. 10. **Farrington-Keith Creative Arts Center, 8099 Main St., Dexter, MI 48130, 313-426-0236**

Deadline October 5-23

### Mail Art, Fax Art

Theme: An act of resistance: Making community(ies). Celebrates Resist's 25th anniversary of funding social change. Show at Mobius, Boston, MA. All mail and Fax art will be shown as part of an otherwise juried exhibition by New England Artists. Fax artists may begin sending work 10/5. No returns, documentation to all. Fax 617-451-2910. **Mail art to : P.O. Box 1136, Cambridge, MA 02142; 617-242-2442; [jeremias@mit.edu](mailto:jeremias@mit.edu)**

Deadline October 8

### Visions In Space

2- and 3-D wall-hung works (except photos). Show Oct 18-Dec. 10, Fiske Planetarium, Univ. of Colorado, Boulder. 20% commission, No insurance. **Mountainside Art Guild, c/o Barbara Tobiska, 31 S. Holland, Lakewood, CO 80226; 303-237-8995**

Deadline October 11

### National Vague Art Invitational

All media work will be selected on the basis of quality, originality and vagueness. \$15/1 slide. Show Dec. 14-31. **Eleven E. Ashland, Phoenix, AZ 85004; 602-257-8543**

Deadline October 15, 5 pm

### New York Digital Salon

Sponsored by NYC ACM/SIGGRAPH; Computer Artist Magazine Institute for Computer in the Arts; and School of Visual Arts. Jurors: Judson Rosebush, and Ylem members Barbara Nessim, Lillian Schwartz and Kenneth Snelson. Show: December 6-17, 1993, NYC Art Directors Club. Entry: up to 4 slides, \$25 (\$5 ea. addn. slide), payable to NYC ACM/SIGGRAPH. Label each entry with artist's name, title of work, dimensions, description of



output (hardware and software if applicable). SASE with sufficient postage required. **Timothy Binkley, School of Visual Arts, 209 East 23rd Street, NY, NY 10010; 212-59202535, FAX 212/725-3587**

*Deadline October 31*

**Tallahassee Combined Talents Florida National Competition**

\$1500 cash awards. 2- and 3-D media ready to exhibit; no glass (unless hand-delivered); if an installation and/or piece with electronic functions is accepted, artist must do installation and setup. \$15/up to 2 entries, 1 slide/2D, 2slides/3D. Show Feb. 4-27. No commission. Insurance. Catalog. **Florida State University Gallery & Museum, Tallahassee, FL 32306, 904-644-6836**

*Deadline November 1*

**National Computer Art Invitational**

\$1,000 purchase awards. Open to U.S. artists. All media created and/or generated on computers (hard copy only). Show opens in January. \$15/up to 10 slides; send with SASE. **Friends of the Gallery, Gallery of Art MS-102, Dept. of Art, Eastern Washington Univ., Cheney, WA 99004, 509-359-7070**

*Deadline December 1*

**Computer Art, A Start in a New Direction**

Thirty computer artists will be chosen for show to travel in Germany. Jurors: Joh. W. Glaw of Germany and Ylem member Daria Barclay of U.S. Send for Prospectus as soon as possible: **German Exhibit, Daria Barclay, 312 NW 10th St., Portland, OR, 97209; 503-640-0525**

*Deadline "Soon"*

**Brussels Festival of Science Fiction Films**

Films plus art expo featuring paintings and sculpture. No fees or commissions. **Festival International du Film Fantastique et de Science-Fiction de Bruxelles, Avenue de la Reine, 144, Koninginelaan, Bruxelles 1210 Belgium, tel. 32/(0)2/242-17-13; Fax 02/216-21-69**

*Deadline "Soon"*

**Club In Berlin Seeks High Tech Art**

The E-Werk, one of Berlin's most progressive clubs, wants to produce a night with international club, video and computer artists in late fall/winter 1993. Wanted: live videoshows, decoration, banner art, installations, projections, performances, or anything else which happens in clubs and at parties. Call: **Elsa, Hans Otto or Kay at Mediamorph, tel. +49-30-611 22 40**

**The Banff Center Studio Residency Program**

For professional artists and critics. Ten-week residency will be held 1/17-3/25, 1994. **Office of the Registrar, The Banff Center for the Arts, Box 1020, Station 28, 107 Tunnel Mountain Drive, Banff, Alberta Canada T0L 0C0; 403-762-6180; tel. 403-762-6345 Fax**

**Video and Music**

D'Cückoo, an SF-based techno/tribal pop group, is seeking video artists to contribute their work for use during live performances. Material should compliment D'Cückoo's highly rhythmic, upbeat sound and high-tech visuals. D'Cückoo is a "techno-artist collective" that has invented and built its own digital percussion instruments. Its music is influenced by rhythms and playing styles from around the world. The tunes are played live, in real time, without sequencers. Meanwhile, colorful and imaginative 3D computer graphics are produced in real time and projected behind or above the band. Send to: **D'Cückoo International, 6114 LaSalle Avenue, #414, Oakland, CA 94611; 510-652-4420**

**Needs/Offerings**

*September 27-December 17*

**The San Francisco Institute of Architecture**

A center for innovation in Design and Education. Fall 1993 Semester. Classes include: The Design Process and the Architectural Mind, Studies in Contemporary Organic Architecture, Women In Architecture, CADD and Computer Technology. Most classes will be held evenings at our new facilities: **555 Howard Street, San Francisco.** Most class fees are \$220 for credit, \$120 non-credit. Studio classes are \$595 for credit, \$220 non-credit. Information Office: **SFIA, PO Box 749, Orinda, CA 94563; 510-254-9397 or 510-254-9395**

*October 31*

**Pre-Painting Offer**

*Sanctuary* is a limited edition of original reverse-glass paintings by Ylem member Dave Archer. This small edition is composed of 36 originals. Each will be similar, yet embody unique variations. Special Pre-Painting price of \$1200 (regular \$2400 after 10/31/93). **Dave Archer Studios, P.O. Box 150180, San Rafael, CA 94915-0180**

*Some calendar items reprinted from Art Calendar (The monthly marketing and career management journal for artists, PO Box 199, Upper Fairmount, MD 21867. Subscriptions \$32/yr.), ISEA Newsletter (International Symposium on Electronic Arts), I/O (New York Chapter, ACM/SIGGRAPH), FineArts Forum electronic news.*

**Chapbooks**

Works by Ylem member Don Webb: *The Seventh Day and After*, \$7.95 from Wordcraft of Oregon, POB 3235, LaGrande, OR 97850. *The Bestseller and Other Tales*, \$3.50 and \$1 postage & handling from Chris Drumm Books (\$6.00 for signed limited edition with bonus story) **Chris Drumm Books, PO Box 445, Polk City, Iowa 50226; info: Don Webb, 000420071@mcimail.com**

**Exploding The Myth of Self-Defense**

"A Survival Guide for Every Woman." Book by Judith Fein, Ph.D., illustrated by Ylem member Nancy Worthington (see pages 4-5). \$15.95 (plus CA tax if applicable), and \$3.00 shipping. Dr. Judith Fein says: "Women do not need to be protected—they can learn to take care of themselves.... Fear is women's greatest enemy—not the rapist.... Sexual harassment is on the same spectrum as rape." Senator Dianne Feinstein has called Fein's previous book, *Are You A Target?*, an "important book on rape prevention." Judith Fein, has a Ph.D. in Exercise Physiology and Physical Education. She grew up in New York City where she learned a practical lesson in "street smarts." In 1974 she developed and continues to conduct the Self-Defense for Women program at San Francisco City College. **Torrance Publishing Company, P.O. Box 2558, Sebastopol, CA 95473; 1-800-437-2338**

**Multimedia Studies**

San Francisco State University Extended Education offers the first comprehensive program for the study, analysis, and practical applications of multimedia. It is positioning itself to be a leader in training people for new industries, new jobs, new art: This is the first phase of what will become the Multimedia Institute. The SFSU Film and Video Program is also located at the Downtown Center. **San Francisco State Univ. Extended Ed., The New Downtown Center, 425 Market St., San Francisco, CA 94105; 415-904-7700**

**Zankros InterArts/New Music Theatre**

*Zankros InterArts:* A center for the electronic music and multimedia arts that offers courses in the broad spectrum of multimedia design and production. *New Music Theatre:* Now in its fifth year, it is committed to live performance which integrates music, theatre, visual arts, literature, electronic arts and dance. Zankros InterArts/New Music Theatre is a non-profit group. **Zakros InterArts, 614 York St., San Francisco, CA 94110; 415-282-5497**

Computer art by Russell Reagan

The SIGGRAPH 93 conference combined with Multimedia 93 this past August, and the 35,000 people who attended the intense joint gathering focussed more on interactive multimedia than computer graphics alone. There was a tremendous amount to see and experience during the six days in Anaheim: art shows, courses, electronic theatres, technology papers and panels, parties and exhibition halls.

The art show had dazzling interactive multimedia installations: At Timothy Binkley's *Books of Change*, you could make a flip book of pictures that morphed between a randomly chosen endangered species animal, yourself and a technological object. Flipping from wolf to human to motherboard made links to an eerie future. *The Picket Fence* by Ylem artists David Gaw and Ed Koch retreated from or followed people, making interesting comments about human influence and boundaries that can shift instead of defining areas immutably. *The Flock* by Ken Rinaldo and Mark Grossman, three hanging robot arms made of grapevines, wires, sensors and microphones, twitched and twittered in response to each other and to people who moved around them. Gregory Garvey's computerized confessional kiosk, complete with printout penance at the end of the kneeling session, was called provocatively *Catholic Turing Test*. Naoko Tosa's *Neuro Baby* was a floating computer graphic cartoon image of a baby that reacted to the tone of your voice by gurgling, cooing, screaming, smiling or giggling on the screen. Bill Seaman's *The Exquisite Mechanism of Shivers*, an interactive videodisk installation, allowed you to combine poetic text fragments, modular music segments and image sequenced to make your own collage of elements. *Faraday's Garden* by Pery Hoberman was a cacophonous room of outdated domestic and media appliances that went on and off as people walked on the rubber mats covering the potentiating switches: eggbeaters, hairdryers, radios, fans, TVs and



Blenders went on and off as people circled the exhibit.

There were many virtual reality kinds of installations. Gregorio Rivera and Michael Joly's *Projecto ESE* (*Electronically Simulated Environment*), a head-mounted 3D display, allowed you to fly over Aztec pyramids or zoom into the small temple rooms on top of them to see murals on the walls. At the *Fakespace* exhibit, you could use a boom and goggles to traverse a city full of traffic and buildings, go down a sewer and emerge out into a fractal landscape of mountains with the sounds of birds. Spectators, meanwhile, could watch the scene from your perspective on a large screen. There were performers in Rafael Lozano-Hemmer's group that danced using wands that triggered radio waves to change the music and images on the screens behind them.

At his powerful interactive documentary, *Portraits of People Living with AIDS*, Hazen Reed said he thought the sexiness of the computers and video technology drew people to a subject they might prefer to ignore or avoid. Once in front of the monitors, people spent time listening to the recorded stories and adding their own video messages to the data base of responses. It was moving to hear and see their reactions to accounts of this modern plague.

The Vivid Group had two rooms across the hall from each other equipped with Mandala systems on whose screens people could see both themselves and those at the other locale. A paint program was incorporated in the system, and by pointing to special screen areas, either person could shift the background and copy or erase

images of bicycles, cars, houses, trees and so on. It was a learning experience for me to try to communicate only by sight to get a stranger to understand visually that if she moved the background, I would copy trees on the hills. It was fun to see our forest of trees travel behind us as we waved our arms, and the experience gave me insights on some of the difficulties and delight of telecommunication.

Because there was no big show of two-dimensional art, Ylem member Patricia Johnson of New York organized a special interest group called "Works on Paper" each afternoon in the Hilton. Artists displayed their wonderfully varied prints and slides, exchanged information and techniques, and proved the point that 2D computer art has more vitality and importance than simply as a background for animation or virtual reality. Patricia also arranged with Iris graphics that 2D art be printed and displayed at several exhibit booths. Next year's SIGGRAPH will again have a juried 2D art show.

Patric Prince, art critic and curator of the Los Angeles area, conducted the Ylem meeting on Tuesday where Carlo Séquin showed slides of his computer forms, Mason Lyte brought prints, and several others showed slides and videos. Good conversation and networking between old and new members was enjoyed by all.

In a different part of the convention center was the SIGKID section for children and schools with ongoing projects and exhibits. In one place, people could combine a music video with computer graphic effects. A man played lovely violin sounds by moving his arms as if drawing a bow across strings: his arms were connected to synthesizers that made music as he moved.

Next year, SIGGRAPH will be in Orlando, Florida, and the Multimedia Special Interest Group will meet on its own. It will be interesting to see how the separation will effect the atmosphere in both groups.

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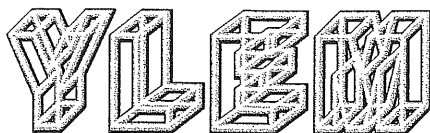
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ISSN 1057-2031

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**October  
Newsletter**

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